



A unique hydrocarbon-seep and hydrate mediated ecosystem at Nyegga-G11, off Mid-Norway

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The complex pockmarks G11, G12, and their immediate surroundings, at 700-750 m water depth at Nyegga off Mid-Norway, were discovered in 2003 and have been re-visited several times since (2004, 2006, and 2010). Although the varied seafloor topography with numerous carbonate blocks, hydrate pingoes, and sub-surface feeder pipes suggest a violent (eruptional) pockmark formation mode, the hydroacoustic, geochemical, and biological conditions currently suggest quiescent micro-seepage modes. However, the diverse and patchily dense biotope suggests this seepage to be highly beneficial for marine life, even at the sub-zero temperature conditions occurring in the area.

Perhaps the most remarkable aspect of G11/G12 is the apparently high abundance of secondary consumers, of which the large ophiuroids (basket stars and starfish) and also the large pycnogonids (sea spiders) bear witness of. There are also numerous vertebrate animals found there. The Eel Pout and Skate are the most common. Because most of the macro-species are non-vent specific (non-chemosynthetic), it is concluded that the animals are opportunists and have been attracted to the location because of abundant nutrients and a varied topography with attachment and refugia possibilities.

Because the effects of hydrocarbon seepage, in general, on the marine benthic environments is poorly constrained and because there is a limited amount of bioactivity on the general seafloor at Nyegga, where the temperature is between -0.5 and -1.0 C, the G11/G12 pockmarks seem to represent a "bio-hotspot" area and is, therefore, found worthy of more detailed and comprehensive physicochemical biological spatiotemporal studies.